Dietary Status of Pre-School Children in Urban and Rural Households in Kabarnet Division, Baringo County, Kenya

Robert M. Aming'a
Department of Education Science
University of Eldoret, Kenya
robaminga@gmail.com

Charlotte A. Serrem
Department of Consumer Science
University of Eldoret, Kenya
charlottejes@gmail.com

Grace M. Mbagaya
Department of Hotel and Hospitality
University of Eldoret, Kenya
mbagaya@hotmail.com

ABSTRACT

The number of children experiencing malnutrition globally declined from 221 million in 1980 to 100 million in 2010. However, sub- saharan African countries had an increase in the average prevalence of stunting of children under five years of age, with the number increasing from 35 million in 1980 to 47 million in 2005. This number is expected to rise to over 49 million by 2015 (Von Braun, 2007). The Eastern Africa region is the most affected in sub-Saharan Africa. Between the period 1980 - 2000, the number of stunted pre-school children increased from about 12.9 million to 24 million. This trend is estimated to continue, leading to about 25 million stunted children by 2015. Prevention of malnutrition becomes more feasible and cost effective if the groups at risk are identified in time and the causes of malnutrition are clearly understood. Against this background, there is a need to continually investigate the underlying status and causes of child malnutrition in different communities and settings. Consequently, this research set out to establish the dietary status of pre-school children in urban and rural households in Kabarnet Division, Baringo County, Kenya. The study population was all the pre-school children aged 3 to 5 years (36-60 months) living in households within the selected locations in Kabamet division of Baringo County. Using the national prevalence levels of stunting of 33.1% for Baringo county (KDHS, 2003), a sample size 340 respondents was chosen. For data collection, two methods were employed; questionnaires and observation. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. Based on the results, it was concluded that pre-school children had inadequate dietary intake of the nutrients assed i.e. energy, proteins, vitamin A and C in both surveys. Dietary inadequacies were notably high three months after harvest when most households had their food stocks depleted. Malnutrition levels in Kabarnet division were high among the pre-school children in both surveys. Both male and female children were equally malnourished. However, higher rates of stunting were reported among male children in both surveys. The study recommended that programs and interventions, which are aimed at improving household food security and alleviating malnutrition among pre-school children in Kabamet division, Baringo district, should be put in place to include both rural and urban households.

Key Words: Dietary Status, Pre-School Children, Urban and Rural Households, Malnutrition

INTRODUCTION

Globally, adequate and well-balanced nutrition is increasingly being emphasized for all humans in all age groups but predominantly pre-school children aged between 2 to 5 years (Mechlem, 2004; Pinstrup-Andersen, 2009). The nutritional status of preschool children is of enormous importance not only because of the delicacy of the preschool stage (formative stage) but also because nutrition at this stage is perceived to have a substantial and persistent impact on their physical and mental development (Tiwari, 2015; Delpeuch *et al.,* 2000). Childhood malnutrition is typically characterized by stunted growth. Anthropometric measurements especially that of children is particularly important in assessing their dietary status (Oliveira *et al.,* 2008; Delpeuch *et al.,* 2000). According to Okoroigwe & Okeke (2009), heights and weights of children, particularly those less than 5 years of age are accepted measures for monitoring their growth and nutritional status, and are also considered as an indicator of the nutritional status of the entire community. Additionally, the conventional outlook of the dietary status of the community is a good way of assessing the nutritional status of preschoolers.

The number of children experiencing malnutrition globally declined from 221 million in 1980 to 100 million in 2010 (Black *et al.,* 2013). However, sub- saharan African countries had an increase in the average prevalence of stunting of children under five years of age, with the number increasing from 35 million in 1980 to 47 million in 1995 (Grantham-McGregor *et al.,* 2007). This number is expected to rise to over 49 million by 2015 (Von Braun, 2007). The Eastern Africa region is the most affected in sub-Saharan Africa. Between the period 1980 - 2000, the number of stunted pre-school children increased from about 12.9 million to 24 million. This trend is estimated to continue, leading to about 25 million stunted children by 2015 (Bhutta & Black, 2013; De Onis *et al.*, 2012).

In Kenya more than three-quarters of food insecure people are in rural areas and half of these live in farm households in marginal lands (Von Braun, 2007; Ngugi & Nyariki, 2005). Although one of the major goals of the Kenyan government is to improve the quality of nutrition of its population (GoK, 2007), it seems the attainment of this objective is sluggish. This is because based on the Welfare Monitoring Surveys (WMS) done at 2009; most of the communities especially in the rural areas are food insecure. For instance, In 2010, Baringo district had 33.1% of pre-school children stunted, 11.3% were acutely wasted and 31.0% were underweight (Muoki, 2012). Additionally, the Kenya Demographic and Health Survey (KDHS, 2009) findings indicated that 31% of pre-school children in Kenya were stunted with 11 % being severely stunted.

The greater percentage of malnutrition in Kenyan communities is hypothesized to be caused by either inadequate or unbalanced diet. A good well balanced meal must contain calories, protein, carbohydrates, vitamins or minerals.

Prevention of malnutrition becomes more feasible and cost effective if the groups at risk are identified in time and the causes of malnutrition are clearly understood. Against this background, there is a need to continually investigate the underlying status and causes of child malnutrition in different communities and settings. Consequently, this research set out to establish the dietary status of pre-school children in urban and rural households in Kabarnet Division, Baringo County, Kenya.

METHODOLOGY

The study was conducted in Baringo County which is in the Rift Valley region in Kenya. The county has a population of 555,561 (2009 census) and an area of 11,075.3 km^2 (4,276.2 sq mi) (KNBS, 2013). The county is occupied by the Tugen, Pokot and Njemps. A cross-sectional study was conducted in the two locations (Rural Ewalel Location- REL and Urban Kabarnet Municipality-UKM) of Baringo County.

The study population was pre-school children aged 3 to 5 years (36-60 months) living in households within the selected locations in Kabamet division of Baringo County. The sample size was determined as recommended by Wittes (2002). Using the national prevalence levels of stunting of 33.1% for Baringo county (KDHS, 2003), a sample size 340 respondents was chosen.

For data collection, two methods were employed; questionnaires and observation. Questionnaires were used to collect data on general household characteristics and food consumption data among the target group. The data on the individual food intake for the target group was collected twice (first and second surveys) i.e. a month after harvesting and three months later, employing the use of 24- hour recall method. The respondents were required to recall the child's food intake during the previous 24-hour period. The names of foods and estimated quantities (using standardized measuring cups) were recorded by the interviewer.

The actual nutrient intake was calculated using the food composition tables particularly developed for Kenya by Sehmi (1993). The diet was assessed on the basis of adequacy in terms of balance and quantity (Garrow *et al.,* 2000). The results were compared with the Recommended Daily Intake (RDI) suggested by Sehmi (1993). The specific nutrients assessed were energy, protein, calcium, vitamin C and A intakes.

Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 21.0 for windows 2007.

RESULTS AND DISCUSSION

Variety of foods consumed during the first survey

The findings from the study indicates that majority of the pre-school children in REL households had at least three meals per day. A wide variety of foods were consumed for breakfast, lunch and supper in the first survey. The results also indicate that breakfast provided a variety of foods mainly energy giving foods. Lunch and supper contained a variety of foods from all the three classes of foods (energy giving, body building and protective foods).

Pre-school children in the UKM households had all the three meals of the day (breakfast, lunch and supper) in the first survey. However there were limited varieties of food for breakfast and lunch in UKM households as compared to REL households. Just like the REL households, foods for breakfast in UKM households were mainly energy giving foods. Foods for lunch and supper were also from the three classes of foods (body building, energy and protective foods).

Many of the pre-school children from REL household consumed tea with milk plus sugar (76%) and left over *Ugali* (44%) for breakfast in the first survey. Rice and beans (77%) and maize mixed with beans (67%) were the frequently consumed meals at lunchtime. Supper was more balanced with the frequent meals being *Ugali* (88%), kales (84%), cabbage (54%), meat (62%) and sour milk (54%).

The findings of the study indicate that majority of the pre-school children from UKM households consumed tea with milk plus sugar (88%) and white bread (62%) in the first survey. The UKM pre-school children's frequently ate rice and beans (79%) and maize mixed with beans (66%). For supper they frequently ate *Ugali* (89%), kales (78%) and meat (67%). The results also shows that pre-school children from REL households had a wide variety of foods for breakfast, lunch and supper as compared to those from the UKM households in the first survey. However, the types of meals consumed by the pre-school children in UKM and REL households for breakfast, lunch and supper in the first survey were almost the same.

Variety of foods consumed during the second survey

The findings of the second survey indicate that pre-school children in the REL households had at least three meals a day. The varieties of foods for breakfast, lunch and supper were relatively fewer compared to those in the first survey. As it were in the first survey, breakfast contained mainly energy giving foods while lunch and supper had foods from the three classes of foods. It is also indicated that the pre-school children mainly had maize meal porridge (73%) for breakfast. The most frequent meal for lunch was maize mixed with beans (76%). For supper the frequently consumed meals were *Ugali* (77%), cabbage (74%) and meat (54%). The findings of the study also indicate that during the second survey, pre-school children in UKM households also had three meals a day.

The meals of the pre-school children in the second survey contained foods of a limited variety unlike in the first survey. Breakfast contained mainly energy giving foods but lunch and supper had foods from the three classes of foods. Tea with milk plus sugar (86%) and white bread (61%) were the frequent meals for breakfast. Maize mixed with beans (76%), rice (59%) and beans (59%) were the frequent meals for lunch. *Ugali* 182%), cabbage (76%) and meat (65%) were the most frequent meals for supper.

The results indicate that pre-school children from UKM households had a wider variety of foods than those from the REL households in the second survey. The types of meals consumed by children in UKM households were not so different during the two surveys. Those consumed by children from REL households were different during the two surveys.

Nutrient intakes during the two surveys

The quantification of the assessed nutrients was based on the lOOg (equivalent to one cup measure) edible portion consumed by the pre-school children. Reference was made to the food composition This was used to arrive at the approximate nutrient intake per child per day. According to the findings of the study, the energy intake of the pre-school children in the first survey was 1551 kilocalories per day per child (Table 1).

Table 1: Nutrient intake during the two surveys

Variable description	**1st survey (n=160)**	**2nd survey (n=160)**	***RDI***
Energy intake in kilocalories	1551	1283	1550
Protein intake in grams	18	15	17.5
Vitamin C intake in milligrams	20	16	20
Vitamin A intake in micrograms	284	246	300
Calcium intake in milligrams	448	399	400-500

The 1551 kilocalories energy intake in the first survey was slightly above the Recommended Daily Intake (RDI) of 1550 kilocalories. In the second survey the energy intake for the pre-school children was 1283 kilocalories, which were lower than the RDI of 1550 kilocalories. The protein intake of the children in the first survey was 18 grams. In the second survey it was 15 grams. This shows that in the first survey protein intake was slightly higher than the RDI of 17.5 grams. In the second survey protein intake was lower than the RDI. Vitamin C intake for the children was 20 milligrams in the first survey and that of the second survey was 16 milligrams. It shows that it is only in the first survey that the children were able to consume Vitamin C of the RDI of 20 milligrams. The pre-school children consumed Vitamin A of 284 micrograms and 246 micrograms in the first and second surveys respectively. In both surveys the children consumed Vitamin A lower than the RDI of 300 micrograms. Calcium intake for the children was 448 milligrams and 399 milligrams in the first and second surveys respectively. The intake in both surveys was within the RDI of 400-500 milligrams.

Table 2: t-test for nutrient intake the two surveys

Nutrient intake in two surveys	F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Kilocalories	8.312	0.004	1.943	638	0.012	-2.042	24.4953	2.94E-02	316.143
Protein	18.626	0	8.212	484	0.02	-3.411	0.4154	2.59E-02	4.2274
Vitamin C		0.012	4.451	635	0	-4.0994	0.2837	3.54E-02	4.6564
Vitamin A		0	7.234	496	0	-3.198	2.16	3.30E-01	41.43
Calcium		0	9.92	562	0.039	-4.644	2.442	4.38E-01	53.44

At the significance level of 0.05, energy p = 0.012, protein p =0.020, vitamin C p = 0.000, vitamin A p = 0.000 and calcium p = 0.039. This means that there was significant difference of means of nutrient intakes between the first survey and second survey (Table 4.11). It indicates that the pre-school children had more intakes of the assessed nutrients in the first survey than in the second survey.

Differences in nutrient intakes in REL and UKM households

Energy intake of the pre-school children in UKM was 1547 kilocalories and that for REL was 1555 kilocalories in the first survey. It shows that children in UKM households had energy intake below the RDI. In the second survey the children had 1119 kilocalories and 1447 kilocalories of energy intake for UKM and REL respectively. This indicates that children in both locations consumed energy below the RDI in the second survey. However children in REL had a higher energy intake than UKM in the second survey.

Protein intake for the pre-school children in UKM was 18 grams and 16 grams for the first and second surveys respectively. Intake for children in REL was 18 grams and 14 grams for the first and second surveys respectively. The findings of the study indicate that in the first survey children in both locations consumed proteins above the RDI (Table 2).

It's shown in Table 2 that children in both locations consumed proteins below the RDI in the second survey. However those from UKM had a higher intake of proteins in the second survey. Children in UKM had a Vitamin C intake of 18 milligrams and 17 milligrams in the first and second surveys respectively. Those in REL had a Vitamin C intake of 22 milligrams and 15 milligrams for the first and second surveys respectively. This shows that children from UKM consumed Vitamin C below the RDI in both surveys. Those from REL consumed Vitamin C above the RDI only in the first survey.

Vitamin A intake of the children in UKM was 288 micrograms and 250 micrograms for the first and second surveys respectively. Children in REL consumed 280 micrograms and 242 micrograms of Vitamin A in the first and second surveys respectively. The results indicate that the pre-school children consumed Vitamin A below the RDI in the two locations in both surveys. Calcium intake for the children in UKM was 443 milligrams and 398 milligrams in the first and second surveys respectively. Those in REL had a calcium intake of 453 milligrams and 400 milligrams for the first and second surveys respectively. The results show that children n REL households had higher intakes of calcium in both surveys.

Table 2: Nutrient intakes in REL and UKM households during the two surveys

Variable description	Location 1st survey n=160:		2nd survey n=160	*RDI*
Energy (kilocalories)	UKM	1547	1119	1550
	REL	1555	1447	
Protein (grams)	UKM	18	16	17.5
	REL	18	14	
Vitamin C (milligrams)	UKM	18	17	20
	REL	22	15	
Vitamin A (micro grams)	UKM	288	250	300
	REL	280	242	
Calcium (milligrams)	UKM	443	398	400-500
	REL	453	400	

As indicated by the t-tests displayed on Table 4.13, it is only proteins that had no significant difference at $p>0.05$; $p = 0.056$, in nutrient intake in the first survey between REL and UKM households. All the other nutrients at the significance level of 0.05, energy $p = 0.036$, Vitamin A$p = 0.000$, Vitamin C$p = 0.025$ and Calcium $p = 0.040$ which meant that there was a significant difference of means of nutrient intake between REL and UKM households in the first survey with REL having a higher consumption of all the nutrients except Vitamin A.

Table 3: t-test for nutrient intakes in REL and UKM households during the first survey

Nutrient intake in 1st surveys	F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Kilocalories	8.312	0.004	1.94	638	0.036	-2.042	24.4953	2.94E-02	316.143
Protein	18.63	0.152	8.21	484	0.056	-3.411	0.4154	2.59E-02	4.2274
Vitamin C		0.012	4.45	635	0.025	-4.0994	0.2837	3.54E-02	4.6564
Vitamin A		0	7.23	496	0	-3.198	2.16	3.30E-01	41.43
Calcium		0	9.92	562	0.04	-4.644	2.442	4.38E-01	53.44

The t-tests Table 4 indicate that for all the assessed nutrients at the significance level of 0.05, energy $p = 0.000$, protein $p = 0.026$, vitamin C $p = 0.000$, vitamin A $p = 0.000$ and calcium $p = 0.000$. This means that there was significant difference of means of nutrient intake between REL and UKM households in the second survey. This implies that nutrient intake between REK and UKM were different during the second survey.

Table 4: t-test for nutrient intakes in REL and UKM households during the second survey

Nutrient intake in 2nd surveys	F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Kilocalories	8.312	0.004	1.94	638	0.000	-2.042	24.495	2.94E-02	316.143
Protein	18.63	0.042	9.01	584	0.026	-3.411	0.4154	2.59E-02	4.2274
Vitamin C		0.012	6.45	635	0.000	-4.099	0.2837	3.54E-02	4.6564
Vitamin A		0	7.73	496	0.000	-3.198	2.1600	3.30E-01	41.43
Calcium		0	2.92	562	0.000	-4.644	2.4420	4.38E-01	53.44

Dietary adequacies for the pre-school children

In reference to the RDI for the nutrients assessed in the study, the results indicated that many of the pre-school children in the two surveys in both REL and UKM households had inadequate intake of energy, proteins, Vitamins C and A. According to the findings, all the pre-school children (100%) had adequate intake of calcium (Table 5).

Table 5 also indicates that the pre-school children had higher intakes of energy, proteins, Vitamins C and A in the first survey than in second survey.

Variable	**Energy**		**Protein**		**Vitamin C**		**Vitamin A**		**Calcium**	
Description	1st s	2nd s	1st s	2nd s	1st s	2nd s	1st s	2nd s	1st s	2nd s
	%	%	%	%	%	%	%	%	%	%
Adequate	47.8	24.4	46.9	23.8	47.2	18.8	36.6	2.8	100	100
Inadequate	52.2	75.6	53.1	76.3	52.8	81.3	63.4	97.2	-	-

Key

1st s: First survey

2nd s: Second survey

The t-test (Table 6) indicates that at the significance level of 0.05, energy p = 0.000, protein p = 0.000, vitamin C p = 0.000 and vitamin A p- 0.000. This means that there was a significant difference of means of dietary adequacies between first and second survey. It indicates that dietary adequacies of the pre-school children were different during the two surveys.

Table 6: t-test for for Equality of Equality Variances of Means

Nutrient intake in 2nd surveys	F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Energy	110.98	0.000	6.355	638	0.000	-0.283	3.69E-02	0.16	0.31
Protein	115.709	0.000	6.298	584	0.026	-0.231	3.67E-02	0.15	0.30
Vitamin C		0.000	8.015	635	0.000	-0.284	3.54E-02	0.22	0.35
Vitamin A		0.000	11.838	496	0.000	-0.337	2.85E-02	0.28	0.39
Calcium	18.627	0.042	8.213	562	0.056	-0.351	0.42E-02	0.29	0.32

Dietary adequacy by household food security during the first survey

The study endeavored to show dietary adequacies by household food security in both surveys and determine if there was any significant difference (Table 7). During the first survey the pre-school children who consumed adequate amounts of the assessed nutrients were from households that were food secure. The results further show that the pre- school children that had inadequate intake of the assessed nutrients were from food insecure households.

Table 7: Dietary intakes by household food security during the first survey

Food Security Level	Energy		Proteins		Vitamin C		Vitamin A		Calcium	
	Ad	Inad	Ad	Inad	Ad	Inad	Ad	Inad	Ad	Inad
	%	%	%	% %	%	%	%	%	%	%
Secure	35.3	0	32.8	37.8	33.4	37.2	27.5	43.1	70.6	0
Moderate	35.4	0	10.9	11.6	10	12.5	6.6	15.9	22.5	0
Insecure	3.4	3.4	3.1	3.8	3.8	3.1	2.5	4.4	6.9	0

Ad- Adequate
Inad-Inadequate

Dietary adequacies by household food security during the second survey

During the second survey a greater percentage of pre-school children who had inadequate intake of the assessed nutrients were from food insecure households. This is indicated by 44.7%, 42.8%, 47.2% and 55.0% for energy, proteins, vitamin C and vitamin A respectively (Table 8).

Table 8: Dietary intakes by household food security during the second survey

Food Security Level	Energy		Proteins		Vitamin C		Vitamin A		Calcium	
	Ad	Inad	Ad	Inad	Ad	Inad	Ad	Inad	Ad	Inad
	%	%	%	% %	%	%	%	%	%	%
Secure	6.90	0	2.20	7.80	2.50	7.50	0	10.00	10.00	0
Moderate	24.10	0	7.20	25.60	6.30	26.60	0.60	32.20	32.80	0
Insecure	12.50	44.70	14.40	42.80	10.00	47.20	2.20	55.00	57.20	0

Results indicate that in the first survey pre-school children in rural households (REL) consumed a variety of foods for breakfast, lunch and supper. The foods were drawn from all the three classes of food (body building, energy and protective foods). Tea with milk plus sugar and left over *ugali* were frequently consumed for breakfast. Rice and beans and maize mixed with beans frequently constituted the lunch meals. Meat, *ugali,* kales (*sukumawiki*), cabbage and sour milk were frequently consumed at suppertime. Children in urban households (UKM) frequently consumed tea with milk plus sugar and white bread for breakfast. Just like in the REL households, rice, beans and maize mixed with beans frequently constituted the lunch menu. Meat, kales and *ugali* were also frequently consumed at suppertime.

The results show that pre-school children in UKM households had a slightly limited variety of foods as compared to those in REL households in the first survey. This is so because most urban households depend on purchasing foods at the market unlike rural households that usually depend on farm production for their food supply. In REL households, a variety of food crops were cultivated which eventually gave the households a wider variety of foods to choose from. However, the types of meals consumed by the pre-school children in UKM and REL households for breakfast, lunch and supper in the first survey were almost the same. These results agree with studies done in Kenya by Kang'ethe (2004).

During the second survey, the REL households' children frequently consumed maize meal porridge plus sugar for breakfast. Maize mixed with beans was frequently consumed for lunch. Meat, cabbage and *ugali* were the frequently consumed meals for supper. Children in UKM households had tea with milk plus sugar and white bread frequently consumed for breakfast during the second survey. Maize mixed with beans and rice and beans were frequently eaten for lunchtime. Cabbage, meat and *ugali* were frequently taken at suppertime. Although pre-school children from both REL and UKM households had at least three meals per day (breakfast, lunch and supper) in the second survey, those from UKM households had a wider variety of foods than the REL households'. The results indicate that the types of meals consumed by children in UKM households were not significantly different during the two surveys. Those consumed by pre-school children from REL households were significantly different during the two surveys. This is so because urban households had a relatively higher and stable income earned as wages and salaries, which they could use to purchase a wider variety of foods even when food was scarce. The depleted food stock in the REL households made it difficult for them to have variety of foods during the second survey.

These results agree with those of Godfray *et al.* (2010) who reported that the average small holder obtained a large share of the daily calorie intake from a limited range of food during times of food scarcity and that for the urban low and middle income groups the food basket is more diverse because of their higher purchasing power.

The appropriate nutrient intake of a child is based on the Recommended Daily Intake/Allowance (RDI/RDA), which is based on the physical health status of a child and highly controlled by the nutrient availability/food security (De Onis *et al.*, 2012). Findings from the study indicate that the pre-school children had adequate intakes of energy, proteins, vitamin C, and calcium in the first survey. However in the second survey the pre-school children attained below the RDI in energy, proteins, vitamin A and C. Both surveys indicated a vitamin A intake of below RDI.

These results are similar to those reported by other researchers indicating that there is low nutrient intake among pre-school children during times of food scarcity in arid and semi-arid areas (McNeil *et al.*, 1988; Fer The results generally reveal that pre-school children from REL households had nutrient intake within the RDI as compared to those from UKM households in the first survey. This is so because when food is available meals are served to the pre-school children in fairly adequate amounts in REL households compared to UKM households. The adequate amounts served to the pre-school children eventually provide most nutrients within the RDI. This is in agreement with similar findings by Mechlem (2004).

The results also reveal that majority of the pre-school children in both UKM and REL households had fairly below RDI for energy, proteins, vitamin A and C during the two surveys. However the intakes were higher in the first survey than in the second survey. Kabamet division being in an arid and semi-arid area is not agriculturally endowed with only 28% of the land being arable (GoK, 2007). This implies that food produced on the farms cannot sustain the household's food security. As a result families are forced to economically use the little food available, which in turn affects the adequacy of the diets offered to the pre-school children. The findings indicate that the pre-school children who had inadequate intakes of the nutrients assessed were from households that were food insecure in both surveys, which supports similar findings by (Kang'ethe, 2004).

CONCLUSION

Based on the results, it was concluded that pre-school children had inadequate dietary intake of the nutrients assed i.e. energy, proteins, vitamin A and C in both surveys. Dietary inadequacies were notably high three months after harvest when most households had their food stocks depleted. Malnutrition levels in Kabarnet division were high among the pre-school children in both surveys. Both male and female children were equally malnourished. However, higher rates of stunting were reported among male children in both surveys.

RECOMMENDATIONS

Programs and interventions, which are aimed at improving household food security and alleviating malnutrition among pre-school children in Kabamet division, Baringo district, should be put in place to include both rural and urban households. Efforts to improve household food security and child nutrition in Kabamet division should be broad based so as to include poverty reduction by increasing household incomes accompanied by improvements in education of the population.

Women empowerment in Kabarnet division should be top on the agenda and supported by the government. The education of mothers/caregivers is important for controlling income. The preferences of mothers/caregivers and fathers differ and could suggest that the partners' power over resources is a function of their education. This calls for longterm investment in formal education of girls beyond primary level and informal education of women in Kabarnet division. Nutrition education for the mother/caregivers on regulation of quantities of food intake and balancing and varying foods will go along way in improving the nutritional status of pre-school children in Kabamet division.

Further research is recommended to establish the possible reasons for the high rates of stunting among male pre-school children in Kabamet division as revealed in the study. The researcher also recommends on future research to assess the physiologic and psychological effects of periodic food fluctuations on children's health.

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